



Point Reyes National Seashore Invasive Plant Early Detection Survey Manual

Introduction

Importance of Early Detection of Invasive Species

Aggressive non-native plants threaten to change the landscape of our national parks. These plants can permanently alter entire ecosystems, reducing the habitable area for the unique plants and animals of the San Francisco Bay Area in the very places set aside to protect them. The window of opportunity for detecting these plants before they become established is relatively small, by the time a plant is noticed as a problem it has usually spread throughout an area. The Weed Watchers help patrol the park for some of the newest invaders—and find them when they can still be prevented from becoming a permanent part of the landscape.

What can you do?

Point Reyes National Seashore has found areas throughout the park that are considered at high risk for invasion. You can help patrol these areas for new weed invasions by conducting invasive species early detection surveys for some known pest plants. These surveys are part of a scientific monitoring program developed by the National Park Service Inventory and Monitoring San Francisco Area Network. The information gathered both about the plants that are seen and the ones that aren't seen in an area will be used to make management decisions and set habitat restoration priorities.

The instructions in this manual will explain how to participate as a Weed Watcher, including how to choose a site to safely conduct Weed Watcher surveys, what plants to look for, what information you need to record during your survey, and how to report your survey results.

Where to look?

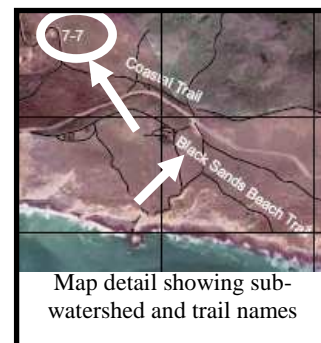
Point Reyes National Seashore includes 70,000 acres located within Marin County. Since there is so much land to cover, the park has been divided into prioritized areas based on susceptibility to invasion and the need for special protection. Choose from the available maps of high priority areas included in the Map Appendix of this manual to find an area that you would like to get to know. You will be visiting this site every other month, at a minimum, so make it a place that will be easy for you to return to.

Once you choose the area that you want to survey, visit the site and take a walk around. Fill out the **site description** area on the “Survey Form 1.” Include directions to the site, the name of the trail/road that you are covering, and the sub-watershed name (a four-digit number such as 12-03 found on your survey map). You will fill out this site description each time you conduct a survey.

What plants to look for?

Forty-three plants have been identified as the highest priority for the park to monitor and control. This ranking is based on both degree of invasiveness (status as a known ecosystem alterer) and feasibility of control (degree of existing infestation, cost of control methods). A list of these plants can be found on the “Point Reyes Weed Watcher Weeds List” included in this manual.

These plants are divided into List 1 and List 2 categories of priority. ID cards which include images, descriptive features, and look-alike plants are included for the List 1 species.



Map detail showing sub-watershed and trail names

If you are unsure about the identity of a plant that you have found, try one of the following techniques.

- **Take a picture** of the plant in question. Include a leaf, a flower (if available), and something like a quarter or your hand for a size reference. Send your picture to Andrea_Williams@nps.gov. Many cell phones have cameras and the ability to send images to an email address for the same price as a text message.

- **Write a detailed description** of the plant in question. Include as many details as possible, including details about the leaves (size, shape, alternate/opposite, lobed/entire); the flower (shape, color, size, orientation); size of plant; and habitat found in. Drawing a picture of the plant will help focus your attention on the details.

Weed Watcher Surveys

The Weed Watcher program is divided into two levels of observer participation. Level 1 surveys focus on locating the 13 highest priority, List 1 plants. The Level 2 survey covers 43 plants from both List 1 and 2 plants. The list of Priority 1 and 2 plants can be found later in this training manual.

When you begin conducting surveys, start with the Priority 1 species. This will allow you to get to know your survey area while focusing on a smaller number of plants. When you feel comfortable with your identification skills for the first 13 plants, you can test your ID skills by going on a guided hike with Weed Watchers program. This skills assessment is required if you would like to conduct the more detailed Level 2 survey.

Plant identification training and Level 2 certification is available from the Point Reyes National Seashore Weed Watchers program (contact Melissa_Potter@nps.gov or call 415-464-5201).

Survey Method

After you have selected a survey location and have familiarized yourself with the plants to search for, you are ready to conduct a survey. Surveys are conducted along walking trails and roadways. You will intensively be looking for weeds on 5 meters (15 feet) on either side of the survey route, and also scanning the hills and drainages on either side of the route. Try to stop every 100 meters (328 feet, or about the length of a football field) to scan your surroundings. Many discoveries occur when taking a break.

To reduce your impact on the area, please restrict your survey route to park trails. If you need to investigate a plant further from the trail, use binoculars to get a better look.

Survey Instructions: What is a plant occurrence?

When you encounter a plant that you identify as one of the targets, take a moment to look around and see if there are more plants around. You will be recording the number of patches, or *occurrences*, of each plant that you find, rather than the number of individual plants that you find. A plant patch is a “patch of plants that occur over the largest possible area with consistent distribution.” The number of plants in each patch will vary depending on the species that you come across. You can include *patch outliers*, or nearby clusters of plants, in your main plant patch if that new patch covers an area that is “less than 50% of the size of the main patch.” This convention will help you save time while mapping.

Determining the boundaries of a plant patch requires some practice. See the plant patch example and the California Native Plant Society (CNPS) cover class examples in this manual for more details.

For each plant that you encounter from Priority List 1 and 2 create an **occurrence point** at the center of the patch either with a GPS or on your paper map. At each **occurrence point** create a point on your paper survey map and/or with a GPS unit and record the following information on Weed Watcher Survey Form 2:

OCC Code (Occurrence Code)- Consisting of the six-digit USDA plant code found on the plant list; the four-digit subwatershed code; the date in four-digit year, two-digit month, and two-digit day; and the occurrence number of that plant for that survey. For instance, if you found the third patch of *Carpobrotus*

edulis of 14 July 2006 in Subwatershed 1-2 you would record caedxx01022006071403 (USDAPC+SUWA+YYYYMMDD+U#).

Species name- Genus and species

Location notes- directions and distinguishing landmarks that will help others find the plant. Use cardinal directions (N,S,E,W) and distances to describe the directions.

Latitude and longitude- in decimal degrees (for example: 37.83583, -122.49556).

For every Priority 1 plant, and Priority 2 plants whose patch size is smaller than 100 m² (10m by 10m; your arm span is likely between 1.5 and 2m long), you will also record some information about the density and distribution of the plants in the patch. To do this, create an **assessment polygon**. An **assessment polygon** is an outline of the perimeter of the patch, created either on a paper map or with a GPS unit. Record the following information about the patch on Form 2.

Location notes- directions and distinguishing landmarks that will help others find the plant. Use cardinal directions (N,S,E,W) and distances to describe the directions.

Cover Class- (0%, 0-1%/trace, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%) over the entire infested area delineated by the assessment polygon.

of individuals per infested area/ m²- count individual plants if possible, especially jubata grass, shrubs, and trees

Phenology- record whether the plant is bolting (bolt), bud, dead/skeleton (dead), flowering (flow.), mature (mat.), rosette (rose.), seed set, seedling **Size-** of the length and width of the patch, in meters or feet, based on pacing or a measuring tape.

Handheld GPS units are available for use during Weed Watcher survey outings. These GPS units have the mobile geographic information systems (GIS) and field mapping software, ESRI ArcPad, and the GeoWeed programs loaded onto them. These programs make it easy to record the location of the plants you find, and to digitally record your survey data. Contact the Weed Watchers program for more information about learning about GPS units and digital data collection.

Return your data sheets to: (A self-addressed stamped envelope is available upon request.)

Point Reyes National Seashore Weed Watchers
1 Bear Valley Rd
Point Reyes Station, Ca 94956

Phone: (415) 464-5201
Email: Melissa_Potter@nps.gov

Phone: (415) 331-0639
Email: Andrea_Williams@nps.gov

Safety First!



Poison Oak-
"Leaves of three, let it be"

- **Poison-oak**, a plant known to cause severe dermal irritation, is found throughout the Golden Gate National Recreational Area. Avoid contact!
- **Deer ticks**, which potentially can carry Lyme disease, are found throughout the park. Use a repellent containing 40% DEET to help deter ticks and always check yourself thoroughly during and after park excursions.
- **Stay on the trail!** This protects sensitive trailside habitats and you from hazardous terrain!
- Carry a **cell phone** if possible. In case of emergency call 911 or Park Dispatch (415-464-5170).

Please follow these instructions for your Level 2 Weed Watcher survey!

The following are instructions for invasive plant surveys for all Priority 1 and Priority 2 Weed Watcher plants, using Survey Form 1 and Survey Form 2, and paper survey maps. Please refer to the Weed Watcher manual introduction for a detailed description of the Weed Watcher program and survey methodology.

1. Make sure that you have the necessary equipment with you.

- Survey Form 1
- Survey Form 2
- Paper map(s) of your area (available from Weed Watcher program)
- ID cards (available from Weed Watcher program) and/or field guides
- Instructions
- Camera (*optional*)
- Binoculars
- GPS (*optional*)
- Field notebook and/or blank paper
- First Aid Kit (*optional*)
- Cell phone (for emergencies)
- Extra pencils or pens

2. For each Priority 1 and 2 plant encountered record an *occurrence point* on your paper map for the center of the patch. Label your point with the first 4 letters of your occurrence name (first 2 letters of the genus and first 2 letters of the species) and the unique occurrence #. Record the following information on Survey Form 2:

- **Weed Occurrence Name:** (USDAPC+SUWA+YYYYMMDD+U#)
- **Species name** (Genus species or common)
- **Notes** (location details such as cardinal direction and distance from path; comments on accessibility of plants; size of plants)
- **Latitude and longitude** (in decimal degrees, e.g. -122.12345, 37.12345)

3. For each Priority 1 plant, and for each Priority 2 plant with a patch < 100 m², draw an *assessment polygon* around the perimeter of the patch.

Record the following information on Survey Form 2:

Assessment

- **Size** (length and width of patch size based on pacing or measuring tape)
- **Cover Class** (0%, 0-1%/trace, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%) for infested area
- **# of plants assessed** (if possible, for jubata grass, trees, thistles, etc.)
- **Treated** (whether the patch was treated mechanically or chemically)

4. At the end of your survey, mark your route on your map with a colored marker and fill out Survey Form

1. Include directions to the site and survey route in the ***trip report***, the total number of occurrences for each of the plants you did and didn't see, and location notes so we can find them on the map. Don't forget to fill out your name and contact information, and time spent on both Survey Forms 1 and 2.

5. Send us your survey! Don't forget to send us:

- Survey map
- Survey Form 1
- Survey Form 2

Questions? Comments?

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Point Reyes Station, Ca 94956

Phone: (415) 464-5201
Email: Melissa_Potter@nps.gov





Phone: (415) 331-0639
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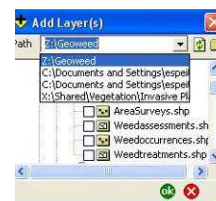
Please follow these instructions for your Level 2 Weed Watcher survey!




Instructions for invasive plant surveys for all Weed Watcher plants, using Survey Form 1 and Survey Form 2, paper survey maps, and a GPS unit loaded with GeoWeed. Please refer to the Weed Watcher manual introduction for a detailed description of the Weed Watcher program and survey methodology.


1. Make sure that you have the necessary equipment with you.

- Survey Form 1
- Survey Form 2
- Paper map(s) of your area (available from Weed Watcher program)
- ID cards (available from Weed Watcher program) and/or field guides
- Instructions
- Camera (*optional*)
- Binoculars
- First Aid Kit (*optional*)
- Field notebook and/or blank paper
- Extra pencils or pens
- Cell phone (for emergencies)
- GPS with background maps and GeoWeed area data (exported from desktop database)

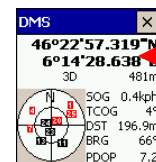
2. Start the ArcPad program on your PDA (**Start> ArcPad 7.01**). Load the GeoWeed occurrence, assessment, survey, and treatment shapefiles (**Add Layers** ). Scroll down **Path to Documents and Settings**, click on the  next to **GeoWeed**, and put a check in all 4 boxes  for **AreaSurveys**, **Weedassessments**, **Weedoccurrences**, **Weedtreatments**. Click on **OK**. These layers will take a couple of minutes to load, so just wait without touching the pad. Then, load your background maps (**Add Layers**  **> Documents and Settings> arcpadimagery> subwatershed#> OK**).




If PDA has an SD card, click on that  SD, then  **arcpad_imagery** and click on the  of the specific watershed. When it asks if the layers should be in WGS84, click on YES.


3. Turn on the GPS by lifting up the antenna on the back of the unit by pulling down on the back sliding button and pressing the “GPS Position Window” button (). You will see a red circle with a yellow cross in the middle of the map when the unit is receiving GPS satellite reception.




You want the GPS points for latitude and longitude to always be in Decimal Degrees. From the GPS Position Window tap on the position coordinate display field until you get drop-down menu. Click on **WGS84 DD GPS**.



Use the magnifying glass to zoom in and out. The *.sid layers are aerial photos. You can bring these just below **Treatment**, **Occurrence**, **Assessment**, but above **Surveys** in the

4. Start a tracklog to record your survey route. Click the down-arrow next to the “GPS Position Window” button () and choose tracklog. The tracklog is enabled if the icon is outlined. This feature can be paused by clicking tracklog once to disable, then again to resume.

5. Enable the GeoWeed toolbar by pressing the GeoWeed key ()

6. For each Priority 1 and 2 plant encountered record an **occurrence point** at the near center of the patch. First activate the GeoWeed occurrence layer (). The point may be taken using your current position by pressing the “Capture Point Using GPS” button () or by using the stylus to draw a point on the map by pressing the “Point” button () and then tapping the point on the map. Record the following information:

Basic Tab

- **OCC Name:** (USDAPC+SUWA+YYYYMMDD+U#)
- **Species name** (Genus species, drop-down list)
- **Data Recorder**
- **Location notes** (directions)

Regions Tab

- **Region 1** (subwatershed from drop-down list)
- **Primary designation (check)**
- **Region 2** (secondary subwatershed or sitename from drop-down list)

Description tab

- **Discovery Year** (if known)
- **Accuracy** (GPS 1 is within 10 feet, GPS 2 is within 30 feet)
- **Confidence in Identification/Reason for doubt** (only enter if less than 95% confident in your ID)

7. For each Priority 1 plant patch, and for each Priority 2 plant with a patch < 100 m², record an **assessment polygon** around the perimeter of the patch. First activate the GeoWeed assessment layer (A). Then create a polygon using satellite positions by pressing the "Polygon" button (M) and then the "Add GPS Vertex" button (A+) several times while walking around the boundary. Alternatively, you can use the stylus to draw a polygon on the map by pressing the "Freehand Polygon" (P) and then using the stylus to draw a shape around the perimeter of the patch. **Note: Do not edit the polygon in ArcPad 6.03. If the initial shape is incorrect, note needed changes on the paper data sheet for later modification in a desktop GIS software program. ArcPad 7.0 allows edits in the field.**

Record the following information:

Basic Tab

- **Choose Occurrence** (occurrence ID Code from the drop-down list)
- **Data Recorder** (data recorder name from the drop-down list)
- **Notes** (location directions)

Time

Time for assessment (mandatory) and treatment (if applicable)

- **Start time** (military time)
- **End time** (military time)

Size Tab

Note: Size is calculated from the polygon; ONLY enter data if you think that polygon may be incorrect—generally, for very small patches.

(Record accurate patch size, overrides polygon area, use for small patches)

Length x Width

Unit of Measurement

Direct Entry (of area in sq m, sq ft, sq mile, hectare)

Stats Tab

- **GPS Accuracy** (GPS 1 is within 10 feet, GPS 2 is within 30 feet)
- **Area** (Primary subwatershed location)
- **Phenology** (bolting, bud, dead/skeleton, flowering, mature, rosette, seed set, seedling)

Misc Tab

- **Cover Class** (0%, 0-1%/trace, 1-5%, 5-25%, 25-50%, 50-75%, 75-95%, 95-100%) for infested area

Also fill out the appropriate spaces on Survey Form 2.

Distribution

Cover Class Desc: Subjective measure of weed distribution.



M = Monoculture, there is nothing but the weed there

U = Uniform distribution and size of weed patches

S = Satellite, one main patch with smaller, satellite patches

L = Linear distribution

I = Isolated patch

8. At the end of your survey, create a **survey point** for the site using the GeoWeed survey button () and the "Capture Point Using GPS" button (). You will record the presence or absence of all Priority 1 species encountered on your survey. Record the following information.

Basic Tab



- **Area** (Primary subwatershed location)
- **Land use type** (Forest)
- **Dominant Veg. Type** (i.e. Coastal Scrub or Annual Gramminoids or Forbs)

1-20 Tab

- **Note the absence of any of the following List 1 plants not encountered on your survey** (do not fill out phenology)

Plumeless Thistle	<i>Carduus acanthoides</i>	Cotoneaster	<i>Cotoneaster franchetti or pannosus</i>
Woolly Distaff Thistle	<i>Carthamus lanatus</i>	Oblong Spurge	<i>Euphorbia oblongata</i>
Purple Starthistle	<i>Centaurea calcitrapa</i>	Licorice Plant	<i>Helichrysum petiolare</i>
Iberian Starthistle	<i>Centaurea iberica</i>	Klamathweed	<i>Hypericum perforatum</i>
Napa Thistle, Tocalote	<i>Centaurea melitensis</i>	Black Locust	<i>Robinia pseudoacacia</i>
Yellow Starthistle	<i>Centaurea solstitialis</i>	Gorse	<i>Ulex europaea</i>

Note: If you are able, record absence information for List 2 or other plants searched for but not seen on your survey, up to 20 plants (see Priority Species List)

9. At the end of your survey, mark your route on your map with a colored marker and finish filling out the presence/absence data on Survey Form 1 for the plants that you did and didn't see. Turn off the tracklog before leaving your survey site. Click on  scroll down and click on  **Exit**. Don't forget to completely fill out Survey Form 1 and two including the trip report which describes your survey route, your contact information, and time spent on the survey. Do not record more than one survey before uploading the digital GeoWeed data, as this may lead to data loss.

Decision Tree for Priority 1, 2, and 3 plants

Priority 1 plants

Occurrence and Assessment

Priority 2 plants

Occurrence; Assessment if patch size is less than 100 m²

Priority 3 plants

Presence/Absence, or Occurrence if patch size is less than 100 m²

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